This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method for maintaining consistency of data, comprising:

copying one or more blocks of data identified by a first structure at a primary site to form a consistent set of data from [[a]] the primary site to a secondary site asynchronously; and

while the primary site is not acknowledging completion of host write requests to any blocks of data, creating a second structure at the primary site, wherein the second structure indicates which blocks of data are modified at the primary site while the consistent set of data is being formed using the first structure.

2. (Original) The method of claim 1, further comprising:

after creating the second structure,

allowing completion of write requests that had not been acknowledged; and

processing new write requests, with modifications to blocks of data being recorded using the second structure.

3. (Original) The method of claim 2, wherein the second structure includes indicators, and wherein each indicator indicates whether a corresponding block of data was modified while the consistent set of data is being formed, further comprising:

receiving a new write request for a block of data; and

if modifications to blocks of data are being recorded using the second structure and an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied,

sending an image of the block of data in cache to remote storage;

setting the corresponding indicator in the first structure to indicate that the block is not to be copied; and

processing the new write request.

4. (Original) The method of claim 2, wherein the second structure includes indicators, and wherein each indicator indicates whether a corresponding block of data was modified while the consistent set of data is being formed, further comprising:

receiving a new write request for a block of data; and

if modifications to blocks of data are being recorded using the second structure, an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied, and the block of data has a new image in cache, applying the new write request to the new image.

5. (Original) The method of claim 4, further comprising:

if at least one of modifications to blocks of data are not being recorded using the second structure and the indicator corresponding to the block of data is not set in the first structure to indicate that the block of data is to be copied, processing the new write request normally.

6. (Previously Presented) The method of claim 4, further comprising:

if modifications to blocks of data are being recorded using the second structure, an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied, and the block of data does not have a new image in the cache,

allocating a new image for the block of data; and

applying the new write request to the new image.

7. (Previously Presented) The method of claim 4, further comprising:

sending an image of a block of data in the cache to remote storage; and

if modifications to blocks of data are being recorded using the second structure and the block of data has an image in the cache,

discarding the image in the cache; and

setting the corresponding indicator in the first structure to indicate that the block is not to be copied.

8. (Currently Amended) A method for asynchronous copy, comprising:

updating indicators in a first structure at a primary site for one or more blocks of data, wherein each indicator in the first structure indicates whether a corresponding block of data was modified at [[a]] the primary site since the block of data was last sent to remote storage; and

while copying the blocks of data identified by the indicators in the first structure as having been modified since the blocks of data were last sent to remote storage, updating indicators in a second structure at the primary site for the one or more blocks of data, wherein each indicator in the second structure indicates whether a corresponding block of data was modified at the primary site while a consistent set of data is being formed using the first structure.

9. (Original) The method of claim 8, further comprising:

after copying a block of data identified by an indicator in the first structure to the remote storage, updating the indicator to indicate that the block of data is synchronized with the remote storage.

10. (Original) The method of claim 8, further comprising:

after receiving a run command,

resuming acceptance of write requests from a host;

updating indicators in the second structure instead of in the first structure; and

copying the blocks of data identified by the indicators in the first structure as having been modified since the blocks of data were last sent to remote storage.

11. (Currently Amended) An article of manufacture for maintaining consistency of data, wherein the article of manufacture causes operations, the operations comprising:

copying one or more blocks of data identified by a first structure at a primary site to form a consistent set of data from [[a]] the primary site to a secondary site asynchronously; and

while the primary site is not acknowledging completion of host write requests to any blocks of data, creating a second structure at the primary site, wherein the second structure indicates which blocks of data are modified at the primary site while the consistent set of data is being formed using the first structure.

12. (Original) The article of manufacture of claim 11, wherein the operations further comprise:

after creating the second structure,

allowing completion of write requests that had not been acknowledged; and

processing new write requests, with modifications to blocks of data being recorded using the second structure.

13. (Original) The article of manufacture of claim 12, wherein the second structure includes indicators, wherein each indicator indicates whether a corresponding block of data was modified while the consistent set of data is being formed, and wherein the operations further comprise:

receiving a new write request for a block of data; and

if modifications to blocks of data are being recorded using the second structure and an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied,

sending an image of the block of data in cache to remote storage;

setting the corresponding indicator in the first structure to indicate that the block is not to be copied; and

processing the new write request.

14. (Original) The article of manufacture of claim 12, wherein the second structure includes indicators, wherein each indicator indicates whether a corresponding block of data was modified while the consistent set of data is being formed, and wherein the operations further comprise:

receiving a new write request for a block of data; and

if modifications to blocks of data are being recorded using the second structure, an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied, and the block of data has a new image in cache, applying the new write request to the new image.

15. (Original) The article of manufacture of claim 14, wherein the operations further comprise:

if at least one of modifications to blocks of data are not being recorded using the second structure and the indicator corresponding to the block of data is not set in the first structure to indicate that the block of data is to be copied, processing the new write request normally.

16. (Previously Presented) The article of manufacture of claim 14, wherein the operations further comprise:

if modifications to blocks of data are being recorded using the second structure, an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied, and the block of data does not have a new image in the cache,

allocating a new image for the block of data; and

applying the new write request to the new image.

17. (Previously Presented) The article of manufacture of claim 14, wherein the operations further comprise:

sending an image of a block of data in the cache to remote storage; and

if modifications to blocks of data are being recorded using the second structure and the block of data has an image in the cache,

discarding the image in the cache; and

setting the corresponding indicator in the first structure to indicate that the block is not to be copied.

18. (Currently Amended) An article of manufacture for asynchronous copy, wherein the article of manufacture causes operations, the operations comprising:

updating indicators in a first structure <u>at a primary site</u> for one or more blocks of data, wherein each indicator in the first structure indicates whether a corresponding block of data was modified at [[a]] <u>the</u> primary site since the block of data was last sent to remote storage; and

while copying the blocks of data identified by the indicators in the first structure as having been modified since the blocks of data were last sent to remote storage, updating indicators in a second structure <u>at the primary site</u> for the one or more blocks of data, wherein

each indicator in the second structure indicates whether a corresponding block of data was modified at the primary site while a consistent set of data is being formed using the first structure.

19. (Original) The article of manufacture of claim 18, wherein the operations further comprise:

after copying a block of data identified by an indicator in the first structure to the remote storage, updating the indicator to indicate that the block of data is synchronized with the remote storage.

20. (Original) The article of manufacture of claim 18, wherein the operations further comprise:

after receiving a run command,

resuming acceptance of write requests from a host;

updating indicators in the second structure instead of in the first structure; and

copying the blocks of data identified by the indicators in the first structure as having been modified since the blocks of data were last sent to remote storage.

21. (Currently Amended) A system for maintaining consistency of data, comprising:

means for copying one or more blocks of data identified by a first structure at a primary site to form a consistent set of data from [[a]] the primary site to a secondary site asynchronously; and

means for, while the primary site is not acknowledging completion of host write requests to any blocks of data, creating a second structure at the primary site, wherein the second structure indicates which blocks of data are modified at the primary site while the consistent set of data is being formed using the first structure.

22. (Original) The system of claim 21, further comprising:

after creating the second structure,

means for allowing completion of write requests that had not been acknowledged; and

means for processing new write requests, with modifications to blocks of data being recorded using the second structure.

23. (Original) The system of claim 22, wherein the second structure includes indicators, and wherein each indicator indicates whether a corresponding block of data was modified while the consistent set of data is being formed, further comprising:

means for receiving a new write request for a block of data; and

if modifications to blocks of data are being recorded using the second structure and an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied,

means for sending an image of the block of data in cache to remote storage;

means for setting the corresponding indicator in the first structure to indicate that the block is not to be copied; and

means for processing the new write request.

24. (Original) The system of claim 22, wherein the second structure includes indicators, and wherein each indicator indicates whether a corresponding block of data was modified while the consistent set of data is being formed, further comprising:

means for receiving a new write request for a block of data; and

means for, if modifications to blocks of data are being recorded using the second structure, an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied, and the block of data has a new image in cache, applying the new write request to the new image.

25. (Original) The system of claim 24, further comprising:

means for, if at least one of modifications to blocks of data are not being recorded using the second structure and the indicator corresponding to the block of data is not set in the first structure to indicate that the block of data is to be copied, processing the new write request normally.

26. (Previously Presented) The system of claim 24, further comprising:

if modifications to blocks of data are being recorded using the second structure, an indicator corresponding to the block of data is set in the first structure to indicate that the block of data is to be copied, and the block of data does not have a new image in the cache,

means for allocating a new image for the block of data; and

means for applying the new write request to the new image.

27. (Previously Presented) The system of claim 24, further comprising:

means for sending an image of a block of data in the cache to remote storage; and

if modifications to blocks of data are being recorded using the second structure and the block of data has an image in the cache,

means for discarding the image in the cache; and

means for setting the corresponding indicator in the first structure to indicate that the block is not to be copied.

28. (Currently Amended) A system for asynchronous copy, comprising:

means for updating indicators in a first structure at a primary site for one or more blocks of data, wherein each indicator in the first structure indicates whether a corresponding block of data was modified at [[a]] the primary site since the block of data was last sent to remote storage; and

means for, while copying the blocks of data identified by the indicators in the first structure as having been modified since the blocks of data were last sent to remote storage, updating indicators in a second structure at the primary site for the one or more blocks of data, wherein each indicator in the second structure indicates whether a corresponding block of data was modified at the primary site while a consistent set of data is being formed using the first structure.

29. (Original) The system of claim 28, further comprising:

means for, after copying a block of data identified by an indicator in the first structure to the remote storage, updating the indicator to indicate that the block of data is synchronized with the remote storage.

30. (Original) The system of claim 28, further comprising:

after receiving a run command,

means for resuming acceptance of write requests from a host;

means for updating indicators in the second structure instead of in the first structure; and

means for copying the blocks of data identified by the indicators in the first structure as having been modified since the blocks of data were last sent to remote storage.